CLAIMS

1. A piezoelectric device comprising:

an element substrate having a piezoelectric element and an electrically conductive pattern connected to the piezoelectric element, which are formed on a principal surface;

a supporting layer arranged in the periphery of the piezoelectric element on the principal surface of the element substrate;

a cover extending so as to form a space inside the external periphery of the element substrate, the space ranging over the entire external periphery of the element substrate, by removing part of elements inside the external periphery of the element substrate viewed from the normal direction of the principal surface of the element substrate after the cover is arranged on the supporting layer;

an insulating reinforcing material that entirely covers portions of the element substrate adjacent to the cover ranging from the cover to the periphery of the principal surface of the element substrate; and

an electrically conductive member electrically connected to the electrically conductive pattern so as to pass through the cover and the reinforcing material.

2. The device according to Claim 1, wherein the cover extends to the outside of the supporting layer from its peripheral face viewed from the normal direction of the principal surface of the element substrate.

3. The device according to Claim 1 or 2, wherein the cover or the supporting layer is one of a polyimide resin, a benzocyclobutene resin, and a silicone resin while the reinforcing material is an epoxy resin or a silicone resin.

4. A manufacturing method for simultaneously manufacturing a plurality of piezoelectric devices comprising the steps of:

a first step of arranging a cover on a supporting layer while forming a first electrically conductive member penetrating the cover to be connected to an electrically conductive pattern, on an element substrate having a piezoelectric element and the electrically conductive pattern connected to the piezoelectric element, which are formed on a principal surface, and the supporting layer formed around the piezoelectric element;

a second step of removing portions ranging from the cover to the element substrate at least inside the external periphery of the element substrate by a laser beam so as to form a space inside the external periphery of the element substrate to be one piezoelectric device viewed from the normal direction of the principal surface of the element substrate, the space extending over the entire external periphery of the element substrate; and

a third step of arranging an insulating reinforcing material on the element substrate and the cover so as to entirely cover portions of the element substrate adjacent to the cover ranging from the cover to the element substrate while forming a second electrically conductive member penetrating the reinforcing material to be connected to the first electrically conductive member.

5. The method according to Claim 4, wherein the wavelength of the laser beam is 355 nm or less.

6. The method according to Claim 4 or 5, further comprising a Step, prepared between the first and second steps, of removing the electrically conductive pattern formed on the principal surface of the element substrate along the boundary between the piezoelectric devices,

each device being one piezoelectric device.

7. The method according to any one of Claims 4 to 6, wherein the third step includes curing the reinforcing material arranged on the element substrate and the cover in a reduced-pressure atmosphere.